In the claims:

1. (original) A method for computing Decision Feedback Equalizer (DFE) coefficients, the method comprising:

estimating the channel response of a channel operated upon by the DFE;

formulating a solution that, when solved, will yield the DFE coefficients, wherein the solution is formulated as a least squares problem that is based upon the channel response;

solving the least squares problem to yield Feed Forward Equalizer (FFE) coefficients of the DFE coefficients;

convolving the FFE coefficients with a convolution matrix that is based upon the channel response to yield Feed Back Equalizer (FBE) coefficients of the DFE coefficients.

2. (currently amended) The method of claim 1, wherein the ~~recursive least squares~~ solution is formulated as a Kalman gain solution to the least squares problem.

3. (original) The method of claim 2, wherein the Kalman gain solution is determined using a Fast Transversal Filter (FTF) algorithm.

4. (original) The method of claim 3, wherein a length of the FBE is chosen to force the FTF algorithm to use a lower triangular matrix.

5. (original) The method of claim 2, wherein the Kalman gain solution is determined using an Array Form Algorithm.

6. (original) The method of claim 5, wherein a length of the FBE is chosen to force the Array Form Algorithm to use a lower triangular matrix.

7. (original) The method of claim 1, wherein in convolving the FFE coefficients with the convolution matrix that is based upon the channel response to yield the FBE coefficients of the DFE coefficients, the method further comprises:

extending a convolution matrix created based upon the channel response to a bigger circulant matrix; and

performing the convolution in a transformed domain.

8. (original) The method of claim 7, wherein the transformed domain is selected from the group consisting of the frequency domain, the Discrete Cosine Transform domain and the Discrete Hadamard Transform domain.

9. (original) The method of claim 1, wherein in convolving the FFE coefficients with the convolution matrix that is based upon the channel response to yield the FBE coefficients of the DFE coefficients, the method further comprises:

extending a convolution matrix created based upon the channel response to a bigger circulant matrix; and

computing the convolution in the frequency domain.

10. (original) The method of claim 9, wherein computing the convolution in the frequency domain includes:

transforming the convolution matrix and the FFE coefficients from the time domain to the frequency domain using a Fast Fourier Transform;

computing the convolution in the frequency domain to produce the FBE coefficients; and

transforming the FBE coefficients from the frequency domain to the time domain.

11. (original) The method of claim 1, wherein the channel response is based upon a known preamble sequence of a packet upon which the DFE operates.

12. (original) The method of claim 1, wherein the channel response is based upon decisions made for data carried in a packet.

13. (original) The method of claim 1, wherein the channel response is based upon:

a known training sequence contained in a packet preamble; and

decisions made for data carried in the packet.

14. (original) A method for computing fractionally spaced Decision Feedback Equalizer (DFE) coefficients, the method comprising:

estimating the channel response of a channel operated upon by the DFE;

formulating a multi-channel solution that, when solved, will yield the fractionally spaced DFE coefficients, wherein the multi-channel solution is formulated as a multi-channel least squares problem that is based upon the channel response;

solving the multi-channel least squares problem to yield fractionally spaced Feed Forward Equalizer (FFE) coefficients of the DFE coefficients;

convolving the fractionally spaced FFE coefficients with a multi-channel convolution matrix that is based upon the channel response to yield Feed Back Equalizer (FBE) coefficients of the DFE coefficients.

15. (currently amended) The method of claim 14, wherein the multi-channel ~~recursive least squares~~ solution is formulated as a multi-channel Kalman gain solution <u>to the multi-channel least squares problem</u>.

16. (original) The method of claim 15, wherein in determining the multi-channel Kalman gain solution, successive order updates are performed.

17. (original) The method of claim 15, wherein the multi-channel Kalman gain solution is determined using a multi-channel Fast Transversal Filter (FTF) algorithm.

18. (original) The method of claim 17, wherein a length of the FBE is chosen to force the multi-channel FTF algorithm to use a lower triangular matrix.

19. (original) The method of claim 17, wherein the multi-channel Kalman gain solution is determined using an Array Form Algorithm.

20. (original) The method of claim 19, wherein a length of the FBE is chosen to force the Array Form Algorithm to use a lower triangular matrix.

21. (original) The method of claim 14, wherein in convolving the fractionally spaced FFE coefficients with the multi-channel convolution matrix that is based upon the channel response to yield the FBE coefficients of the DFE coefficients, the method further comprises:

extending a multi-channel convolution matrix created based upon the channel response to a bigger circulant matrix; and

computing the convolution in a transformed domain.

22. (original) The method of claim 21, wherein the transformed domain is selected from the group consisting of the frequency domain, the Discrete Cosine Transformation domain and the Discrete Hadamard Transformation domain.

23. (original) The method of claim 21, wherein a Croniker product is employed in computing the convolution in the transformed domain.

24. (original) The method of claim 14, wherein in convolving the fractionally spaced FFE coefficients with the multi-channel convolution matrix that is based upon the channel response to yield the FBE coefficients of the DFE coefficients, the method further comprises:

extending the multi-channel convolution matrix created based upon the channel response to a bigger circulant matrix; and

computing the convolution in the frequency domain.

25. (original) The method of claim 24, wherein computing the convolution in the frequency domain includes:

transforming the multi-channel convolution matrix and the fractionally spaced FFE coefficients from the time domain to the frequency domain using a Fast Fourier Transform;

computing the convolution in the frequency domain to produce the FBE coefficients; and

transforming the FBE coefficients from the frequency domain to the time domain.

26. (original) The method of claim 14, wherein the channel response is based upon a known preamble sequence of a packet upon which the DFE operates.

27. (original) The method of claim 14, wherein the channel response is based upon decisions made for data carried in a packet.

28. (original) The method of claim 14, wherein the channel response is based upon:

a known training sequence contained in a packet preamble; and

decisions made for data carried in the packet.

29. (original) A method for computing Decision Feedback Equalizer (DFE) coefficients, the method comprising:

estimating the channel response of a channel operated upon by the DFE;

formulating a solution that, when solved, will yield the DFE coefficients, wherein the solution is formulated as a least squares problem that is based upon the channel response;

solving the least squares problem using a Kalman gain solution to yield Feed Forward Equalizer (FFE) coefficients of the DFE coefficients;

convolving the FFE coefficients with a convolution matrix that is based upon the channel response to yield Feed Back Equalizer (FBE) coefficients of the DFE coefficients.

30. (original) The method of claim 29, wherein the Kalman gain solution is determined using a Fast Transversal Filter (FTF) algorithm.

31. (original) The method of claim 29, wherein convolving the FFE coefficients with a convolution matrix is performed in a transformed domain.

32. (original) The method of claim 31, wherein the transformed domain is selected from the group consisting of the frequency domain, the Discrete Cosine Transformation domain and the Discrete Hadamard Transformation domain.

33. (original) The method of claim 29, wherein the DFE is fractionally spaced.

34. (original) A method for computing Decision Feedback Equalizer (DFE) coefficients, the method comprising:

estimating the channel response of a channel operated upon by the DFE;

formulating a solution that, when solved, will yield the DFE coefficients, wherein the solution is formulated as a least squares problem that is based upon the channel response;

solving the least squares problem using a Kalman gain solution to yield Feed Forward Equalizer (FFE) coefficients of the DFE coefficients using a Fast Transversal Filter (FTF) algorithm;

convolving the FFE coefficients with a convolution matrix that is based upon the channel response to yield Feed Back Equalizer (FBE) coefficients of the DFE coefficients.

35. (original) The method of claim 34, wherein in convolving the FFE coefficients with the convolution matrix that is based upon the channel response to yield the FBE coefficients of the DFE coefficients, the method further comprises:

extending a convolution matrix created based upon the channel response to a bigger circulant matrix; and

performing the convolution in a transformed domain.

36. (original) A method for computing Decision Feedback Equalizer (DFE) coefficients, the method comprising:

estimating the channel response of a channel operated upon by the DFE;

formulating a solution that, when solved, will yield the DFE coefficients, wherein the solution is formulated as a least squares problem that is based upon the channel response;

solving the least squares problem using a Kalman gain solution to yield Feed Forward Equalizer (FFE) coefficients of the DFE coefficients using an Array Form Algorithm;

convolving the FFE coefficients with a convolution matrix that is based upon the channel response to yield Feed Back Equalizer (FBE) coefficients of the DFE coefficients.

37. (original) The method of claim 36, wherein in convolving the FFE coefficients with the convolution matrix that is based upon the channel response to yield the FBE coefficients of the DFE coefficients, the method further comprises:

extending a convolution matrix created based upon the channel response to a bigger circulant matrix; and

performing the convolution in a transformed domain.

38. (original) The method of claim 37, wherein the transformed domain is selected from the group consisting of the frequency domain, the Discrete Cosine Transformation domain and the Discrete Hadamard Transformation domain.

39. (original) A Decision Feedback Equalizer (DFE) comprising:

a Feed Forward Equalizer (FFE) having an input that receives an uncompensated signal and an output;

a Feed Back Equalizer (FBE) having an input and an output;

a Decision block having an input that receives a combination of the output of the FFE and the output of the FBE and an output that couples to the input of the FBE and produces data; and

a processor that generates FFE coefficients and FBE coefficients, wherein the processor:

estimates the channel response of a channel operated upon by the DFE;

formulates a solution that, when solved, will yield the DFE coefficients, wherein the solution is formulated as a least squares problem that is based upon the channel response;

solves the least squares problem to yield FFE coefficients; and

convolves the FFE coefficients with a convolution matrix that is based upon the channel response to yield FBE coefficients.

40. (currently amended) The Decision Feedback Equalizer of claim 39, wherein the processor formulates the solution ~~to the recursive least squares problem~~ as a Kalman gain solution to the least squares problem.

41. (original) The Decision Feedback Equalizer of claim 40, wherein the processor determines the Kalman gain solution using a Fast Transversal Filter (FTF) algorithm.

42. (original) The Decision Feedback Equalizer of claim 41, wherein a length of the FBE is chosen to force the FTF algorithm to use a lower triangular matrix.

43. (original) The Decision Feedback Equalizer of claim 39, wherein in convolving the FFE coefficients with the convolution matrix that is based upon the channel response to yield the FBE coefficients of the DFE coefficients, the processor:

extends a convolution matrix created based upon the channel response to a bigger circulant matrix; and

performs the convolution in the frequency domain using a Fast Fourier Transform (FTF) technique.

44. (original) The Decision Feedback Equalizer of claim 39, wherein the processor estimates the channel response based upon a known preamble sequence of a packet upon which the DFE operates.

45. (original) The Decision Feedback Equalizer of claim 39, wherein the processor estimates the channel response based upon decisions made for data carried in a packet.

46. (original) The Decision Feedback Equalizer of claim 39, wherein the processor estimates the channel response based upon:

a known training sequence contained in a packet preamble; and

decisions made for data carried in the packet.